VARIABLE STIFFNESS OPTICAL FIBER SHAFT

ABSTRACT OF THE DISCLOSURE

The variable stiffness optical fiber shaft includes an optical fiber , and at least one coaxial layer of heat shrink polymer disposed over the optical fiber of a length shorter than the optical fiber , to provide variations in stiffness along the length of the shaft. The variable stiffness optical fiber shaft preferably includes a plurality of coaxial layers of heat shrink polymer encapsulating the optical fiber , extending from the proximal end of the optical fiber toward the distal end, the plurality of coaxial layers having different lengths to provide said optical fiber shaft with varying stiffness over the length of the optical fiber shaft. The plurality of coaxial layers can be arranged in successive progressively shorter coaxial layers, and can be formed of heat shrink polymeric material, such as polyethylene, PTFE, PEEK, PET or PPS. The variable stiffness optical fiber shaft can also include a coaxial strain relief member disposed over the outer coaxial polymer layers at the proximal end, and a connecting hub disposed over the strain relief member. The variable stiffness optical fiber shaft can also include a hypo tube attached to the optical fiber, and a reinforcing braid attached over the optical fiber, as well as a radiopaque marker that can be a reinforcing coil. A shape memory collar can also be attached over the distal end of the optical fiber, with a distal sheath extending over a portion of the shape memory collar. A hub can also be attached over the proximal portion of the optical fiber. A method of constructing the variable stiffness optical fiber shaft is also provided.